

Annual Index of Articles: 1993

ADMIXTURES

What's new in chemical admixtures? Provides an overview of recent products including freeze-protection admixtures, extended set-controls, corrosion inhibitors, finishability aids, and prepackaged admixtures. (5 pp; 93:533)

AIR ENTRAINMENT

Air bubbles in fresh concrete: Part 2 of 4 explains the following concepts: how to obtain and retain air bubbles for an effective air-void system in hardened concrete, air-entraining admixtures, and how handling affects air voids. (4 pp; 93:148)

Measuring air in fresh and hardened concrete: Part 3 of 4 details tests done on fresh and hardened concrete and the importance of having a trained specialist conduct them. (4 pp; 93:275)

Specifying air-entrained concrete: Part 4 of 4 stresses how effective specifications are based on clear, written requirements. Discusses air-content requirements, air at point of discharge vs. point of placement, ensuring adequate air, specifying the air-void system, and enforcing specifications. (7 pp; 93:361)

Why is there air in concrete?: Part 1 of 4 discusses how small, well-dispersed air voids in concrete can improve workability, reduce bleeding and segregation, and improve resistance to freezing and thawing. Also deals with air bubbles and voids, effects of air voids, frost-resistant concrete, volume of air required, void size and spacing, and complicating factors. (3 pp; 93:11)

BRIDGES

Bridge deck overlays: Explains how careful selection of overlay materials and construction methods help ensure excellent performance. Covers surface preparation, finishing and curing, overlay types, and performance. (5 pp; 93:415)

Cast-in-place details enhance short-span bridge: Describes 60-foot-span bridge in Pennsylvania that combines cast-in-place and precast concrete for an award-winning design. (2 pp; 93:217)

Contractor builds a bridge in his spare time: Relates the process by which a contractor built a 35-foot-long structure featuring a concrete deck, 10 concrete pillars, and stone-faced sidewalls with arched openings. (1 p; 93:832)

Pedestrian bridge uses precast and cast-in-place concrete: Details the process by which the Unity Bridge in Costa Mesa, Calif., was built in 90 days without interrupting traffic. (2 pp; 93:369)

BUILDING CODE

How ACI develops its building code: Describes how the American Concrete Institute creates and revises its code of requirements for the design and construction of concrete structures. (1 p; 93:219)

CERTIFICATION

Certifying plants and people in the concrete industry: Overview of concrete industry certification programs including those designed for plants—precast, prestressed, and ready mixed concrete—and individuals. (6 pp; 93:206)

COATINGS

Beware of internal moisture when coating concrete: Discusses the consequences of restricting moisture movement, measuring moisture content, and classifying and selecting products. (4 pp; 93:421)

COLORED CONCRETE

Tips for coloring concrete: Details the following methods of coloring: integrally colored concrete, aggregate exposure, chemical stains, dry-shake hardeners, and decorative barrier coatings. Also describes how to cure colored concrete. (4 pp; 93:345)

COMPRESSORS

Selecting a portable compressor: Describes the importance of considering the unit's capacity, operating pressure, and engine. Explains the different types of compressors and features of the engine such as power reserve, gasoline vs. diesel, and direct vs. gear drive. (3 pp; 93:875)

CONCRETE CANOES

Students paddle it out in concrete canoe competition: Describes the

American Society of Civil Engineers' concrete canoe competition sponsored by Master Builders Inc. Details the work and process two university teams used in designing and building their canoes. (5 pp; 93:616)

CORROSION

Concrete cover: Discusses environment and corrosion, concrete quality, cover as corrosion protection, strategies for additional protection, and water to cementitious materials ratio. (3 pp; 93:427)

CRACKS

Control of shrinkage and curling in slabs on grade: Last of a three-part series emphasizes ways to control slab cracking through the following methods: use of distributed reinforcement, use of shrinkage-compensating concrete, post-tensioning, and removal of restraints to shrinkage and expansion. (6 pp; 93:42)

Evaluating cracks in concrete walls: Explains the importance of discovering the cause of a crack before repair. Explores the subjects of measuring crack width, when a crack is too wide, long-term crack width, why cracks occur, cracks in reinforced and unreinforced walls, and moving cracks. (4 pp; 93:16)

Troubleshooting concrete cracking during construction: Discusses typical types of cracks found in slabs on grade and other structures, their causes, and ways to prevent them. (6 pp; 93:700)

CRANES

Crane safety basics: Describes how knowing the fundamentals of crane operation and lifting a load safely can prevent accidents and increase jobsite efficiency. Discusses entering the cab, preplanning, outriggers, crane capacity, hand signals, and lift procedures. (3pp; 93:869)

DEMOLITION

Breaking up is easy to do: Discusses the different features of excavator-mounted concrete demolition attachments and their speed and efficiency. Rates hammers, explains their productivity and operation, and provides information on crushers. (5 pp; 93:474)

Engineered demolition of earthquake-damaged bridge structures: Details new equipment technology that challenges well-established demolition considerations. Covers hydraulic equipment, engineering analysis, and project details. (6 pp; 93:480)

Hospital benefits from unique crushing method: Describes a case in which demolition was performed under tight restrictions regarding noise, dust, and space. (2 pp; 93:506)

Safe demolition: Stresses the following predemolition steps: conduct an engineering survey, hold prejob safety meetings, and know how to use equipment safely. Also includes safety information on hand tools, power tools, and machine-mounted tools. (3 pp; 93:503)

DURABILITY

Durable concrete: Examines the different forces that act on concrete and the ways they can be controlled. Includes discussion of abrasion, chemical attack, corrosion of reinforcement, freezing and thawing, reactive aggregates, and scaling. (5 pp; 93:542)

EPOXY INJECTION

Epoxy injection of cracked slabs: Discusses the economical, long-term solution to cracked slabs including evaluating crack repairs, injection procedures, surface sealing, and long-term performance. (4 pp; 93:253)

FINISHING

Cold-weather finishing: Describes how planning ahead can minimize delayed set and lower labor costs. Discusses window of finishability, concrete temperature, mix design, jobsite practices, and finishing problems. (5 pp; 93:786)

Finishing tools for concrete flatwork: Provides an overview on how to choose, use, and maintain the following tools: spreaders and rakes, straightedges, tampers, bull floats and darbies, hand floats, edgers, groovers, trowels, and brooms and brushes. (6 pp; 93:777)

Good vibrations: Shows how choosing the right vibrating screed can increase production and lower labor costs. Explains the power sources and the many types of screeds available—beam, truss, roller, and vehicle-mounted. (3 pp; 93:257)

Matching power trowels to job needs: Discusses the following issues:

differences between walk-behind and ride-on trowels, non-overlapping and overlapping blades, blade types, trowel attachments and additions, transportation, safety and training, and maintenance. (4 pp; 93:771)

FLATWORK

Creating custom-designed concrete flatwork: Contractor explains his procedures for coloring and texture-stamping concrete flatwork. Covers various aspects of the process, including mix design, placing and finishing, applying color hardener, and applying colored release agent. Texture stamping and special effects are also discussed. (3 pp; 93:37)

FLOORS

Craftsmanship and planning lead to quality floor: Relates how a warehouse floor is constructed to meet the owner's needs for flatness, durability, and attractive appearance. Discusses preconstruction planning, subbase, form setup, concrete placement, finishing, sealing, and protection. (2 pp; 93:883)

Placing flat floors: Explores methods of improving flatness without greatly increasing construction costs. Discusses the factors that can affect flatness and levelness, and how flatness is measured. (3 pp; 93:261)

Warehouse floor project challenges contractor: Shows how despite time restrictions and strict specifications, contractor completed project ahead of time. Explains how overlapping of power troweling and joint cutting helped keep the project on schedule. (2 pp; 93:33)

FORM LINERS

Patterned form liners for architectural concrete: Suggests how to use patterned liners to improve appearance and conceal minor blemishes. Covers liner materials, types of liners for wood, plastic, and polystyrene forms, reinforcement and tie covers, joints, release agent and stripping, and form cleanliness. (5 pp; 93:331)

FORMWORK

Avoiding form failures: Explores the issues of problem areas, economy vs. safety, and shared responsibility in regard to formwork. (4 pp; 93:683)

Can you use plywood forms without oiling?: Discusses features of panels with polymeric resin coating that require no release agent. Explains their design properties, fabri-

cation and use, cleaning and reuse, and cost. (4 pp; 93:156)

Forms for circular tank walls: Provides information on choosing the correct formwork for liquid-retaining structures. Discusses modular panels or wood forms, fixed-radius walers, adjustable-radius walers, and manufactured metal forms. (6 pp; 93:267)

Forms for concrete columns: Discusses a variety of systems, including round column forms, rectangular column forms, and polystyrene forms. Also covers column form erection and lateral pressure. (6 pp; 93:687)

Form reuse: Explains how to cut costs and increase profits by planning for multiple uses of form materials. (3 pp; 93:197)

Nonmetallic form ties: Shows how fiber-reinforced plastic ties can be an effective alternative to metal ties. Discusses various plastic tie systems and how they can be used. (4 pp; 93:695)

Tunnel forms speed construction of multistory residence hall: Describes project at San Diego State University where a contractor with a 14-man crew, completed a floor every six days. Provides forming details and information on preplanning. (3 pp; 93:290)

HISTORY

First reinforced concrete skyscraper in the U.S.: Details the design and construction of the first reinforced concrete skyscraper—the Ingalls Building in Cincinnati. (3 pp; 93:733)

In the beginning there was ... beton agglomerate: Relates the history of French engineer Francois Coignet and how he developed the use of high-strength concrete. (3 pp; 93:567)

HOT-WEATHER CONCRETING

Keeping concrete cool in the heat of summer: Explains the effects of temperature, problems and solutions, and hot-weather concrete testing. (4 pp; 93:433)

JOINT SEALANTS

Flexible waterstops: Describes the different types of waterstops, their applications and installation, and precautions. (5 pp; 93:354)

MANAGEMENT

Five barriers to TQM in construction: Explains how the following barriers can hinder management: lack of trained workers, competitive markets, poor plans and specifications, bad attitudes, and lack of competent field managers. (3 pp; 93:297)

To grow or not to grow: Addresses the issue of growth—its benefits and drawbacks. Points out the costs and risks associated with growth and offers some alternatives. Deals with topics such as volume vs. margins, marketing, downsizing, staffing, capitalization, and keeping up with change. (5 pp; 93:50)

MARKETING

High-priced help: Part 2 of 2 details factors affecting cost, such as overhead, bidding, trade discounts, shrinkage, and field productivity. Also covers how to motivate employees, increase productivity, and measure performance. (2 pp; 93:894)

Marketing basics for contractors: Part 1 of 2 discusses how a company can come to know its customers and understand how to reach them. Stresses the following steps: know the product, define the market, know what to say, reach customers, and respond to their needs. (5 pp; 93:819)

MATERIAL HANDLING

Concrete boom trucks: Provides tips for better pumping, making a concrete pumping contractor's life easier, and using boom trucks safely. (3 pp; 93:639)

Moving on up: Explains features of different material hoists along with OSHA regulations and safety procedures. (3 pp; 93:437)

Two concrete pumps place 2,824-cubic-yard foundation mat: Describes a project in which long boom reaches help contractor complete project in two days. (2 pp; 93:294)

NOTABLE STRUCTURES

America's tallest concrete tower rises above Vegas desert: Gives background of the Stratosphere Tower and the self-climbing gang forms used to speed construction and reduce labor requirements. Details the process of raising the forms for the project. (2 pp; 93:7)

Child of the Sun: Showcases Florida Southern College, which is built of reinforced concrete and is the largest one-site collection of Frank Lloyd Wright architecture in the world. (2 pp; 93:352)

Two Vegas hotels use 300,000 cubic yards of concrete: Describes construction of MGM Grand Hotel and Luxor Hotel featuring precast and cast-in-place concrete structural elements. Focuses on the construction

details of each hotel including: parking structures, hotel core, hotel floors, special-events center, and inclined elevator cores. (5 pp; 93:22)

PAVING

Cooperation is key for pavement award winners: Provides names and project details of the winners and runners-up in the fourth annual National Awards Program for Excellence in Concrete Pavement sponsored by the American Concrete Pavement Association and Aberdeen's *Concrete Construction*. (3 pp; 93:886)

Denver's new International Airport: Explains integral role played by slipform pavers in the massive airport project that used 4.4 million cubic yards of concrete. Includes information on balancing the mix, paving operation, and quality control. (4 pp; 93:599)

French use slipform pavers in Eurotunnel: Describes the joint English and French project to link England with mainland Europe. Explains the advantages of slipform paving and the specifics of railbed and sidewalk paving. (3 pp; 93:135)

Isolation and expansion joints in concrete pavements: Explains how improper use of expansion joints can lead to pavement failure and high construction and maintenance costs. (2 pp; 93:611)

New curb and gutter pavers adapt to job demands: Provides an overview of the features and capabilities of recent models. (4 pp; 93:605)

U.S. tour of European concrete highways: Explains how European highways are built with more concern for design, materials, and construction excellence than cost, and why this results in superior pavements. (4 pp; 93:644)

POURED CONCRETE WALLS

Applying waterproofing sheets to below-grade walls: Discusses sheet membranes that are fabricated to a certain thickness and are ready to install when they arrive at the job. Includes information on accessory products, sheet installation, protection and backfilling, and precautions. (4 pp; 93:139)

Joints in poured walls: Suggests effective methods for controlling unsightly wall cracking. Cast-in-place concrete walls use three types of joints, each discussed in this article:

contraction joints, expansion joints, and construction joints. (4 pp; 93:143)

Placing and vibrating poured concrete walls: Offers proper techniques to help reduce common problems. Details the process and considerations necessary for pre-pour planning, mix design, placing, and vibrating. Also explains common problems that can occur, such as blockouts, bugholes, honeycombing, and cold joints. (3 pp; 93:131)

PRECAST CONCRETE

Precast concrete fence has only two components: Describes precast concrete fence that consists of one-piece rail sections and end posts. (1 p; 93:222)

PROBLEM CLINIC

January (2 pp; 93:64)

- Causes for air content fluctuations
- Streaks in walls caused by new aluminum forms
- Information on constructing post-tensioned slabs on grade

February (2 pp; 93:161)

- Adding chlorides for flatwork mix
- More on rebar shadowing
- Cleaning white concrete
- Slump loss and mix water content
- Footing elevations

March (1 p; 93:220)

- Patching materials for frozen deck slabs
- Is entrained air required for wet-mix shotcrete?

April (2 pp; 93:300)

- Detail calls for wire mesh that's continuous through a keyway
- Building post-tensioned slabs on grade

May (1 p; 93:378)

- Antiqued surface for existing concrete
- Trial mixes by ready mix producers
- Mat test for moisture

June (1 p; 93:444)

- Steel vibrator head may damage epoxy-coated rebars
- Stains from straw
- Field testing for cold-weather concrete

July (1 p; 93:509)

- Type I/II cement
- Tolerances for slab on grade thickness
- Dowels or keys in a 4-inch slab

August (2 pp; 93:573)

- Using the break-off test to measure in-place strength
- Adding water

September (2 pp; 93:650)

- Old reinforcing bar systems
- Patching with black concrete
- Curing lightweight-concrete test cylinders

October (1 p; 93:741)

- Cutting dowel bars
- Sealers and sealants

November (1 p; 93:829)

- Late-winter concrete
- Gym floor flatness

December (2 p; 93:900)

- Adding latex paint to concrete
- What's infrared thermography?

READY MIX

Ordering ready mix concrete: Discusses such aspects as specifying the concrete, information needed before delivery, batch ticket information, and revising the order during delivery. (2 pp; 93:538)

RECYCLING

Recycling concrete pavements: Explains how using crushed concrete as aggregate conserves resources and eliminates disposal costs. Considers recycling operations, aggregate characteristics, using recycled aggregate, and new pavement construction. (4 pp; 93:470)

REINFORCING STEEL

Rebar inspection: Contains a checklist of procedures and minimum requirements for inspection acceptance. Discusses material inspection, bar supports, rebar tying requirements, splices, coatings, tolerances, and in-place bending and rebending. (4 pp; 93:27)

REPAIR

Foundation repair: Uses case histories to describe useful approaches to stabilizing foundations. Cases involve hydraulic piles, grout columns, compaction grouting, controlling tower settlement, and a home with severe settlement. (5 pp; 93:622)

Repairing architectural precast concrete: Discusses typical patching situations, materials, and methods common to precast repair. Explains the use of preconstruction mock-up. (3 pp; 93:201)

SAFETY

Beware the iceberg: Points to the importance of an effective safety program by illustrating the many hidden costs related to an accident. (1 p; 93:185)

Famous last words overheard on the jobsite: Explains in a humorous way common safety mistakes made on the jobsite. (1 p; 93:251)

Hey, Mr. Contractor, what's in it for Joe?: Gives tips for involving new employees in safety programs and stresses the benefits of doing so. (2 pp; 93:328)

How well do you know OSHA?: Twenty-question quiz lets reader know if it's time for a refresher course in safety. (2 pp; 93:405)

SCULPTURE

Artist uses cement as a window to the soul: Describes the sculpting process of Rick True who uses a cementitious mix to create unique, expressive, and environmentally responsible art. (1 p; 93:572)

SHOTCRETE

Building a shotcrete home: Describes a family's 10-year project of building a multiple-dome shotcrete home in Oregon. (5 pp; 93:371)

Shotcrete application tolerances: Points out the need for more definite specifications to avoid ambiguity and reduced quality. Lists suggested tolerances and how they can be kept reasonable. (3 pp; 93:287)

Shotcrete homes challenge wood-frame construction: Relates how a New England company produces affordable homes using wire-reinforced insulated shotcrete construction. Describes the composition, characteristics, and erection of the panels. (4 pp; 93:798)

Shotcrete pumps and related equipment: Details the types of pumps particular to dry-mix and wet-mix shotcrete; their benefits, air requirements, and auxiliary equipment; and recommended safety precautions. (3 pp; 93:153)

The wide world of shotcrete: Describes the types of shotcrete and their applications. Stresses the importance of using proper procedures when applying this versatile material in a wide variety of applications. (2 pp; 93:890)

SILICA-FUME CONCRETE

Silica-fume concrete proves to be an economical alternative: Shows the advantages of silica-fume concrete including increased strength, resistance to chloride-induced corrosion, and lower maintenance and life-cycle costs. (2 pp; 93:441)

TESTING

Testing fresh concrete in the field: Discusses the following aspects of testing: sampling fresh concrete, slump, concrete test cylinders, air content by the pressure method, temperature, and using an accredited testing lab. (5 pp; 93:550)

Testing hardened concrete: Provides an overview of how some standardized tests are performed, what they measure, and factors that can affect test results. (5 pp; 93:727)

TILT-UP

Marketing tilt-up: Examines a method of marketing that involves recognizing limitations, emphasizing value, and creating a prospect database. (2 pp; 93:561)

Tilt-up basics: Describes how to successfully plan and execute a tilt-up construction project, including planning and design, construction, and information sources. (7 pp; 93:337)

Tilt-up concrete houses—yesterday and today: Details a 1950s tilt-up subdivision including site planning and slab preparation, panel casting and erection, and finishing details. (3 pp; 93:564)

TROUBLESHOOTING

Troubleshooting tips: Provides helpful tips for a variety of concrete problems. (15 pp; 93:487)

TUNNELS

Building a concrete tunnel—one piece at a time: Details Boston's Third Harbor Tunnel project including information on shaping the sections, outfitting the interior, concrete mix proportions, exterior concrete work, creating the trench, and lowering the sections. (6 pp; 93:407)

WHITETOPPING

W-h-i-t-e-t-o-p-p-i-n-g spells relief in Iowa: Portrays whitetopping as the best solution for rehabilitating aging asphalt by detailing its different uses in Iowa. Covers early projects in Iowa, including pavement design, construction details, and advanced technology. (5 pp; 93:792)

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